

**Soyuz 7 Return Samples: Assessment of Air Quality Aboard the International Space Station**

The toxicological assessments of one grab sample canister (GSC), 6 dual sorbent tubes (DSTs), and 20 formaldehyde badges returned aboard Soyuz 7 are reported. Analytical methods have not changed from earlier reports. Surrogate standard recoveries from the GSC were 84-89%. The recoveries of the less volatile surrogates from the DSTs were 87 to 112%; however,  $^{13}\text{C}$ -acetone was only recovered at 53-59%. Formaldehyde recoveries from 2 lab controls were 87 and 95%; trip controls were not returned to ground.

The two general criteria used to assess air quality are the total-non-methane-volatile organic hydrocarbons (NMVOCs) and the total T-value (minus the  $\text{CO}_2$  and formaldehyde contributions). Control of atmospheric alcohols is important to the water recovery system engineers, hence total alcohols (including acetone) are also shown for each sample. Because formaldehyde is quantified from sorbent badges, its concentration is also listed separately. These four indices of air quality are summarized below:

<u>Sample &amp; Location</u>	<u>Date</u>	<u>NMVOCs</u> ( $\text{mg}/\text{m}^3$ )	<u>T Value</u> <sup>a</sup> (units)	<u>Alcohols</u> ( $\text{mg}/\text{m}^3$ )	<u>Formaldehyde</u> ( $\mu\text{g}/\text{m}^3$ )
Lab/For.	12/15/03	ns <sup>b</sup>	ns	ns	40
SM/For.	12/15/03	ns	ns	ns	30
Lab/For.	12/29/03	ns	ns	ns	46
SM/For.	12/29/03	ns	ns	ns	40
Lab/For.	1/27/04	ns	ns	ns	44
SM/For.	1/27/04	ns	ns	ns	34
Lab DST	3/3/04	7	0.87	4	ns
SM DST	3/3/04	8	0.91	5	ns
SM GSC	3/18/04 <sup>c</sup>	11	0.61	6	ns
SM DST	3/18/04 <sup>c</sup>	10	0.91	7	ns
Lab DST/For	3/22/04	9	0.89	6	50
SM/For	3/22/04	ns	---	---	44
Lab DST/For	4/19/04	9	0.75	7	42
SM DST/For.	4/19/04	10	0.91	7	30
<i>Acceptable Guideline:</i>		<25	<1	<5	50

<sup>a</sup> Formaldehyde and  $\text{CO}_2$  not included in T calculation.

<sup>b</sup> ns = no sample available

<sup>c</sup> Taken 4-6 days after problems with the Elektron oxygen generator

All formaldehyde concentrations were within the long term SMAC. The Lab samples continue to show somewhat higher values than the SM samples. The T values and NMVOCs are within acceptable guidelines; however, the total alcohol levels slightly exceed the guideline of  $5 \text{ mg}/\text{m}^3$ . The GSC sample taken several days after the Elektron anomaly showed above nominal concentrations of aromatic compounds (when compared to analyses from recent flights) as follows: toluene,  $0.12 \text{ mg}/\text{m}^3$ ; xylenes,  $0.30 \text{ mg}/\text{m}^3$ ; and ethylbenzene,  $0.14 \text{ mg}/\text{m}^3$ . Simultaneous sampling with the DST gave concentrations about 13-20 % below these values. Although the air samples are sparse, there are no indications that air quality has degraded in the ISS. For all but the most volatile compounds, the DSTs provide adequate air samples in a much smaller package than the GSCs.

Enclosures

Table 1: Analytical Concentrations of DST and GSC Samples

Table 2: T-Value Calculations of DST and GSC Samples

TABLE 1  
ANALYTICAL RESULTS OF  
COMBINED GSC and DUAL SORBENT AIR SAMPLES RETURNED ON SOYUZ 75

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)						
	AA03686 LAB S/N 1001 3/3/04@ 10:15GMT (DST SAMPLE)	AA03687 SM S/N 1008 3/3/04@ 10:30GMT (DST SAMPLE)	AA03658 SM ELEKTRON S/N 1036 3/18/2004 (GSC SAMPLE)	AA03688 SM ELEKTRON S/N 1002 3/18/2004 (DST SAMPLE)	AA03689 LAB S/N 1007 3/22/04@ 10:00GMT (DST SAMPLE)	AA03690 LAB S/N 1004 4/19/04@ 09:16GMT (DST SAMPLE)	AA03691 SM S/N 1005 4/19/04@ 09:30GMT (DST SAMPLE)
TARGET COMPOUNDS (TO-14/POLAR)***							
Freon 12	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Chloromethane	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Freon 114	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Methanol*	0.3	0.4	0.24	0.3	0.3	0.4	0.4
Acetaldehyde	0.22	0.23	0.20	0.24	0.19	0.17	0.16
Vinyl Chloride	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Bromomethane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Ethanol*	3	4	5.5	6	5	6	6
Chloroethane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Acetonitrile	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Propenal	TRACE	TRACE	< 0.02	TRACE	TRACE	TRACE	TRACE
Acetone	0.16	0.19	0.21	0.22	0.20	0.17	0.22
Propanal	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
2-Propanol	0.12	0.13	0.14	0.13	0.15	0.13	0.13
Freon 11	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Furan	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Acrylonitrile	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Pentane	< 0.054	TRACE	< 0.05	TRACE	TRACE	< 0.045	TRACE
2-Methyl-2-Propanol	TRACE	TRACE	< 0.05	TRACE	TRACE	TRACE	TRACE
Methyl Acetate	TRACE	TRACE	< 0.05	TRACE	TRACE	< 0.045	< 0.055
1,1-Dichloroethene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Dichloromethane	0.07	0.07	0.08	0.08	0.08	0.08	0.08
3-Chloropropene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Freon 113	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
n-Propanol	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
1,1-Dichloroethane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Butanal	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
2-Butanone	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
cis-1,2-Dichloroethene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
2-Methylfuran	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Ethyl Acetate	TRACE	0.06	TRACE	TRACE	TRACE	TRACE	TRACE
Hexane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Chloroform	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
2-Butenal	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
1,2-Dichloroethane	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
1,1,1-Trichloroethane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
n-Butanol	0.08	0.10	0.08	0.10	0.10	0.10	0.10
Benzene	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Tetrachloromethane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
2-Pentanone	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Pentanal	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
1,2-Dichloropropane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
1,4-Dioxane	< 0.054	TRACE	< 0.05	TRACE	TRACE	TRACE	TRACE
Trichloroethene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
2,5-Dimethylfuran	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
4-Methyl-2-Pentanone	< 0.054	TRACE	TRACE	TRACE	< 0.054	< 0.045	TRACE
cis-1,3-Dichloropropene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
2-Pentenal	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
trans-1,3-Dichloropropene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
1,1,2-Trichloroethane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Toluene	TRACE	TRACE	0.12	0.15	0.09	0.05	TRACE
Hexanal	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Mesityl Oxide	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
1,2-Dibromoethane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Butyl Acetate	TRACE	TRACE	0.06	0.07	TRACE	TRACE	TRACE
Tetrachloroethene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Chlorobenzene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Ethylbenzene	TRACE	TRACE	0.14	0.17	0.07	TRACE	TRACE
meta+para-Xylenes	TRACE	0.06	0.16	0.20	0.14	0.06	0.07
2-Heptanone	< 0.054	TRACE	< 0.05	TRACE	< 0.054	< 0.045	TRACE
Cyclohexanone	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Heptanal	TRACE	TRACE	TRACE	TRACE	< 0.054	< 0.045	TRACE
Styrene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
1,1,2,2-Tetrachloroethane	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Ortho-Xylene	0.09	0.12	0.14	0.16	0.14	0.09	0.10
1,3,5-Trimethylbenzene	< 0.054	< 0.054	< 0.05	TRACE	< 0.054	< 0.045	< 0.055
1,2,4-Trimethylbenzene	< 0.054	< 0.054	TRACE	TRACE	TRACE	< 0.045	< 0.055
1,3-Dichlorobenzene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
1,4-Dichlorobenzene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
1,2-Dichlorobenzene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
1,2,4-Trichlorobenzene	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
Hexachloro-1,3-Butadiene	< 0.082	< 0.081	< 0.05	< 0.081	< 0.081	< 0.068	< 0.082

**TABLE 1**  
**ANALYTICAL RESULTS OF**  
**COMBINED GSC and DUAL SORBENT AIR SAMPLES RETURNED ON SOYUZ 75**

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)						
	AA03686 LAB S/N 1001 3/3/04@ 10:15GMT (DST SAMPLE)	AA03687 SM S/N 1008 3/3/04@ 10:30GMT (DST SAMPLE)	AA03658 SM ELEKTRON SN 1036 3/18/2004 (GSC SAMPLE)	AA03688 SM ELEKTRON S/N 1002 3/18/2004 (DST SAMPLE)	AA03689 LAB S/N 1007 3/22/04@ 10:00GMT (DST SAMPLE)	AA03690 LAB S/N 1004 4/19/04@ 09:16GMT (DST SAMPLE)	AA03691 SM S/N 1005 4/19/04@ 09:30GMT (DST SAMPLE)
<b>TARGET COMPOUNDS (TOXIC)</b>							
1,3-BUTADIENE	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
ETHYLENE OXIDE	< 0.054	< 0.054	< 0.05	< 0.054	TRACE	< 0.045	< 0.055
CARBON DISULFIDE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
2-METHYL-2-PROPENAL	< 0.054	TRACE	< 0.05	TRACE	TRACE	TRACE	TRACE
3-BUTEN-2-ONE	TRACE	TRACE	< 0.05	TRACE	TRACE	TRACE	TRACE
2-ETHOXYETHANOL	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
DIMETHYLDISULFIDE	< 0.054	< 0.054	< 0.05	< 0.054	< 0.054	< 0.045	< 0.055
OCTAMETHYLCYCLOTETRAILOXANE	0.43	0.50	1.1	0.45	0.46	0.41	0.46
<b>NON-TARGET COMPOUNDS**</b>							
CARBONYL SULFIDE	0.12	0.15	0.004	0.13	0.16	0.12	0.13
TRIMETHYLSILANOL	0.074	0.077	0.081	0.069	0.096	0.092	0.089
2-METHYL HEXANE	0.010	0.014	0.008	0.016	0.008	0.006	0.020
2,3-DIMETHYLPENTANE	0.004	0.005	0.004	0.004	0.004	0.003	0.003
3-METHYLHEXANE	0.007	0.009	0.008	0.008	0.007	0.005	0.006
N-HEPTANE	0.007	0.008	0.004	0.006	0.007	0.005	0.006
HEXAMETHYLCYCLOTRISILOXANE	0.66	0.63	2.0	0.63	0.60	0.55	0.77
BENZALDEHYDE	0.016	0.025	0.024	0.017	0.019	0.013	0.017
LIMONENE	0.049	0.062	0.039	0.045	0.046	0.040	0.046
DECAMETHYLCYCLOPENTASILOXANE	0.14	0.26	0.27	0.14	0.17	0.18	0.20
<b>TOTAL ALCOHOLS PLUS ACETONE</b>	<b>4</b>	<b>5</b>	<b>6.2</b>	<b>7</b>	<b>6</b>	<b>7</b>	<b>7</b>
<b>TARGET COMPOUNDS (GC)***</b>							
CARBON MONOXIDE	NR	NR	<1.3	NR	NR	NR	NR
METHANE	NR	NR	9.8	NR	NR	NR	NR
HYDROGEN	NR	NR	0.91	NR	NR	NR	NR
CARBON DIOXIDE	NR	NR	9000	NR	NR	NR	NR
<b>TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)</b>	<b>7</b>	<b>8</b>	<b>11.1</b>	<b>10</b>	<b>9</b>	<b>9</b>	<b>10</b>

< : Values are less than the laboratory report detection limit.

TRACE: Amount detected is sufficient for compound identification only. Calculations are based on one-half of the laboratory report detection limit  
(0.05 mg/m3 for VOCs; and 0.02 mg/m3 for propenal.)

NR: The DSTs are not designed to adsorb these compounds

NOTE: High levels (above 1.5 ppm) of methanol ethanol, acetone, isopropanol and 2-butanone are routinely reported based on calibrated GC-FID measurements.

\*NOTE: In DST samples methanol and ethanol concentrations were adjusted for 25% average recovery from positive DST controls

\*\*NOTE: Non-target compounds are estimated using historical reference ("B Value") response factors.

\*\*\*Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration

TABLE 2  
ANALYTICAL RESULTS OF  
COMBINED GSC and DUAL SORBENT AIR SAMPLES RETURNED ON SOYUZ 7S

CHEMICAL CONTAMINANT	T-VALUE (180-DAY SMACs)						
	AA03686 LAB S/N 1001 3/3/04@ 10:15GMT (DST SAMPLE)	AA03687 SM S/N 1008 3/3/04@ 10:30GMT (DST SAMPLE)	AA03658 SM ELEKTRON SN 1036 3/18/2004 (GSC SAMPLE)	AA03688 SM ELEKTRON S/N 1002 3/18/2004 (DST SAMPLE)	AA03689 LAB S/N 1007 3/22/04@ 10:00GMT (DST SAMPLE)	AA03690 LAB S/N 1004 4/19/04@ 09:16GMT (DST SAMPLE)	AA03691 SM S/N 1005 4/19/04@ 09:30GMT (DST SAMPLE)
TARGET COMPOUNDS (TO-14/POLAR)***							
FREON 12	0.00006	0.00006	0.00005	0.00006	0.00006	0.00005	0.00006
CHLOROMETHANE	0.00066	0.00066	0.00061	0.00066	0.00066	0.00055	0.00067
FREON 114	ND	ND	ND	ND	ND	ND	ND
METHANOL*	0.04	0.04	0.02620	0.04	0.04	0.04	0.04
ACETALDEHYDE	0.05580	0.05650	0.04997	0.06033	0.04795	0.04285	0.04103
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND	ND	ND	ND
ETHANOL*	0.002	0.002	0.00273	0.003	0.002	0.003	0.003
CHLOROETHANE	ND	ND	ND	ND	ND	ND	ND
ACETONITRILE	0.00403	0.00403	0.00373	0.00403	0.00403	0.00336	0.00410
PROPENAL	0.36667	0.36667	ND	0.36667	0.36667	0.30000	0.36667
ACETONE	0.00306	0.00371	0.00397	0.00427	0.00379	0.00322	0.00415
PROPANAL	0.00750	0.00750	0.00694	0.00750	0.00750	0.00625	0.00764
2-PROPANOL	0.00079	0.00086	0.00094	0.00084	0.00099	0.00084	0.00083
FREON 11	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003
FURAN	ND	ND	ND	ND	ND	ND	ND
ACRYLONITRILE	0.00964	0.00964	0.00893	0.00964	0.00964	0.00804	0.00982
PENTANE	ND	0.00005	ND	0.00005	0.00005	ND	0.00005
2-METHYL-2-PROPANOL	0.00023	0.00023	ND	0.00023	0.00023	0.00019	0.00023
METHYL ACETATE	0.00023	0.00023	ND	0.00023	0.00023	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND
DICHLOROMETHANE	0.00679	0.00721	0.00757	0.00828	0.00890	0.00830	0.00826
3-CHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND
FREON 113	ND	ND	ND	ND	ND	ND	ND
N-PROPANOL	0.00028	0.00028	0.00026	0.00028	0.00028	0.00023	0.00028
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND
BUTANAL	0.00614	0.00614	0.00568	0.00614	0.00614	0.00511	0.00625
2-BUTANONE	0.00090	0.00090	0.00083	0.00090	0.00090	0.00075	0.00092
CIS-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND
2-METHYLFURAN	ND	ND	ND	ND	ND	ND	ND
ETHYL ACETATE	0.00015	0.00035	0.00014	0.00015	0.00015	0.00013	0.00015
HEXANE	ND	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND
2-BUTENAL	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	0.02700	0.02700	0.02500	0.02700	0.02700	0.02250	0.02750
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND
N-BUTANOL	0.00205	0.00260	0.00209	0.00243	0.00247	0.00238	0.00247
BENZENE	0.13500	0.13500	0.12500	0.13500	0.13500	0.11250	0.13750
TETRACHLOROMETHANE	ND	ND	ND	ND	ND	ND	ND
2-PENTANONE	ND	ND	ND	ND	ND	ND	ND
PENTANAL	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND
1,4-DIOXANE	ND	0.00038	ND	0.00038	0.00038	0.00031	0.00038
TRICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND
2,5-DIMETHYLFURAN	ND	ND	ND	ND	ND	ND	ND
4-METHYL-2-PENTANONE	ND	0.00019	0.00018	0.00019	ND	ND	0.00020
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND
2-PENTENAL	ND	ND	ND	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND
TOLUENE	0.00045	0.00045	0.00204	0.00253	0.00155	0.00076	0.00046
HEXANAL	0.00443	0.00443	0.00410	0.00443	0.00443	0.00369	0.00451
MESITYL OXIDE	ND	ND	ND	ND	ND	ND	ND
1,2-DIBROMOETHANE	ND	ND	ND	ND	ND	ND	ND
BUTYL ACETATE	0.00014	0.00014	0.00030	0.00035	0.00014	0.00012	0.00014
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND
CHLORO BENZENE	ND	ND	ND	ND	ND	ND	ND
ETHYL BENZENE	0.00054	0.00054	0.00281	0.00341	0.00148	0.00045	0.00055
META+PARA-XYLENES	0.00012	0.00027	0.00074	0.00089	0.00065	0.00029	0.00032
2-HEPTANONE	ND	0.00117	ND	0.00117	ND	ND	0.00120
CYCLOHEXANONE	0.00045	0.00045	0.00042	0.00045	0.00045	0.00038	0.00046
HEPTANAL	0.00386	0.00386	0.00357	0.00386	ND	ND	0.00393
STYRENE	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	ND
ORTHO-XYLENE	0.00041	0.00054	0.00063	0.00075	0.00063	0.00041	0.00047
1,3,5-TRIMETHYLBENZENE	ND	ND	ND	0.00180	ND	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND	0.00167	0.00180	0.00180	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND
HEXACHLORO-1,3-BUTADIENE	ND	ND	ND	ND	ND	ND	ND

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CHEMICAL CONTAMINANT	T-VALUE (180-DAY SMACs)						
	AA03686 LAB S/N 1001 3/3/04@ 10:15GMT (DST SAMPLE)	AA03687 SM S/N 1008 3/3/04@ 10:30GMT (DST SAMPLE)	AA03658 SM ELEKTRON SN 1036 3/18/2004 (GSC SAMPLE)	AA03688 SM ELEKTRON S/N 1002 3/18/2004 (DST SAMPLE)	AA03689 LAB S/N 1007 3/22/04@ 10:00GMT (DST SAMPLE)	AA03690 LAB S/N 1004 4/19/04@ 09:16GMT (DST SAMPLE)	AA03691 SM S/N 1005 4/19/04@ 09:30GMT (DST SAMPLE)
<b>TARGET COMPOUNDS (TOXIC)</b>							
1,3-BUTADIENE	ND	ND	ND	ND	ND	ND	ND
ETHYLENE OXIDE	ND	ND	ND	ND	0.00150	ND	ND
CARBON DISULFIDE	0.00169	0.00169	0.00156	0.00169	0.00169	0.00141	0.00172
2-METHYL-2-PROPENAL	ND	0.01588	ND	0.01588	0.01588	0.01324	0.01618
3-BUTEN-2-ONE	0.06279	0.06279	ND	0.06279	0.06279	0.05233	0.06395
DIMETHYLDISULFIDE	ND	ND	ND	ND	ND	ND	ND
2-ETHOXYETHANOL	ND	ND	ND	ND	ND	ND	ND
OCTAMETHYLCYCLOTRASILOXANE	0.036	0.04204	0.09447	0.03717	0.03835	0.03415	0.03803
<b>NON-TARGET COMPOUNDS**</b>							
CARBONYL SULFIDE	0.01009	0.01240	0.00030	0.01082	0.01349	0.00972	0.01111
TRIMETHYLSILANOL	0.00199	0.00208	0.00220	0.00187	0.00259	0.00248	0.00239
2-METHYL HEXANE	0.00033	0.00049	0.00028	0.00057	0.00026	0.00019	0.00068
2,3-DIMETHYLPENTANE	0.00002	0.00003	0.00002	0.00014	0.00002	0.00001	0.00002
3-METHYLHEXANE	0.00024	0.00031	0.00027	0.00026	0.00026	0.00016	0.00021
N-HEPTANE	0.00003	0.00004	0.00002	0.00021	0.00003	0.00002	0.00003
HEXAMETHYLCYCLOTRASILOXANE	0.07340	0.07039	0.22380	0.07007	0.06686	0.06119	0.08521
BENZALDEHYDE	0.00009	0.00014	0.00014	0.00010	0.00011	0.00008	0.00010
LIMONENE	0.00009	0.00011	0.00007	0.00008	0.00008	0.00007	0.00008
DECAMETHYLCYCLOPENTASILOXANE	0.00902	0.01735	0.01809	0.00921	0.01113	0.01219	0.01350
<b>TARGET COMPOUNDS (GC)***</b>							
CARBON MONOXIDE	NR	NR	0.00000	NR	NR	NR	NR
METHANE	NR	NR	0.00259	NR	NR	NR	NR
HYDROGEN	NR	NR	0.00267	NR	NR	NR	NR
CARBON DIOXIDE	NR	NR	0.69214	NR	NR	NR	NR
<b>TOTAL T-VALUE</b>	<b>0.87159</b>	<b>0.91069</b>	<b>1.32575</b>	<b>0.90815</b>	<b>0.89010</b>	<b>0.75557</b>	<b>0.91084</b>

ND : Value is less than the laboratory report detection limit.

Note: Number of decimal places in T-Values do not represent significant figures of measurements.

NR: The DSTs are not designed to adsorb these compounds

\*\*\*Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.